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Recent Developments and Applications of Atomic Resolution Electron Microscopy and Spectroscopy -- A Silver Jubilee

Sub-Ångstrom Atomic Resolution Electron Microscopy

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Twenty-five years ago, the Cowley group at ASU pioneered the use of transmission electron microscopy for high resolution, and achieved unique images showing the content of the crystal unit cell at better than 4Å resolution. Subsequent improvements in resolution enabled researchers to pinpoint heavy atom positions at 2Å resolution, followed by light atoms (down to lithium) at 1Å resolution. These progressive improvements in resolution (as well as parallel improvements in holography, EELS and EDS) have earned HRTEM a well-deserved position as an essential tool for the characterization of materials.

HRTEM at sub-Ångstrom resolution will play an essential role in the verification of structures researched in the emergent nanotech revolution. Sub-Ångstrom resolution has been demonstrated by the Berkeley OÅM (One-Ångstrom Microscope) project using focal-series reconstruction of the specimen exit surface wave. Results from the OÅM foreshadow those to be expected from next-generation TEMs with Cs-corrected lenses and monochromated electron beams.

http://www.asu.edu/clas/csss/workshops/symposium/

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